

The Department of Natural Resources and Environmental Control is concerned about five interrelated factors that, if not addressed, could severely impact water quality, recharge and drainage at the site (see detailed comments below):

- Middletown's lack of a sourcewater protection ordinance, as required by Title 7, Chapter 60, Section 6082
- What appears to be a significant underestimate of impervious cover
- The location of the entire parcel within an excellent recharge area
- The location of a stormwater infiltration pond in that excellent recharge area, with the potential for altering recharge capacity and contaminating groundwater
- The location of a gas station in that recharge area, also with the potential to cause groundwater contamination with underground storage tanks

Soils

Based on the New Castle County soil survey, Reybold-Sassafras complex and Reybold Hambrook complex were mapped on subject parcel. Reybold-Sassafras complex and Reybold-Hambrook complex are well-drained uplands soils that, generally, have few limitations for development.

Impervious Cover

Based on information provided by the applicant in the PLUS application form, this project's post-development surface imperviousness is estimated to reach 75%. However, given the scope and density of this project (i.e., large commercial business park) this estimate appears to be a significant underestimate. When calculating surface imperviousness, it is important to include all forms of constructed surface imperviousness (i.e., rooftops, parking lots, sidewalks, open-water stormwater management structures, and roads) in the calculation for surface imperviousness; this will ensure a realistic assessment of this project's likely post-construction environmental impacts. Since some of these forms of surface imperviousness may have been omitted or incompletely assessed in the initial calculation, this calculation should be revised or recalculated with all of the aforementioned forms of surface imperviousness included.

Studies have shown a strong relationship between increases in impervious cover to decreases in a watershed's overall water quality. It is strongly recommended that the applicant implement best management practices (BMPs) that reduce or mitigate some of its most likely adverse impacts. Reducing the amount of surface imperviousness through the use of pervious paving materials ("pervious pavers") in lieu of asphalt or concrete in conjunction with an increase in forest cover preservation or additional tree plantings are some examples of practical BMPs that could easily be implemented to help reduce surface imperviousness. Moreover, since the proposed project is a commercial project likely to generate a large concentration of imperviously paved surface cover, it is strongly recommended that at least 50% of paved area(s) contain pervious paving materials in lieu of conventional paving materials.

TMDLs

Total Maximum Daily Loads (TMDLs) for nitrogen and phosphorus have been promulgated through regulation for the Appoquinimink watershed. A TMDL is the maximum level of pollution allowed for a given pollutant below which a “water quality limited water body” can assimilate and still meet water quality standards to the extent necessary to support use goals such as, swimming, fishing, drinking water and shell fish harvesting. Although TMDLs are required by federal law, states are charged with developing and implementing standards to support these desired use goals. In the Appoquinimink watershed, a post-development TMDL reduction level of 60 percent will be required for both nitrogen and phosphorus. Additionally, an 8% reduction in bacteria will also be required.

TMDL Compliance through the Pollution Control Strategy (PCS)

As stated above Total Maximum Daily loads (TMDLs) for nitrogen and phosphorus have been promulgated through regulation for the Appoquinimink Watershed. The TMDL calls for a 60% reduction for nitrogen and phosphorus from baseline conditions. Additionally, an 8% reduction in bacteria will also be required. The Department developed an assessment tool to evaluate how your proposed development may reduce nutrients to meet the TMDL requirements. Additional reductions may be possible through the implementation of Best Management Practices as, reducing surface imperviousness, increasing passive wooded open space, and the use of green-technology stormwater management treatment trains. Contact Lyle Jones at 302-739-9939 for more information on the assessment tool.

Water Resource Protection Areas

The DNREC Ground-Water Protection Branch (GPB) has determined that the project falls entirely within an excellent ground-water recharge potential area for the Town of Middletown (see following map and attached map).

The proposed development extends northerly outside of the parcel identified in the application.

GPB recommends:

- Identify all parcels under development

The Town of Middletown has **NOT adopted a source water protection ordinance** as mandated by Title 7, Delaware Code, Chapter 60, Subchapter VI, § 6082. The Town’s 2005 Comprehensive Land Use Plan expressed the Town’s concern and intent to address water quantity and quality by minimizing any negative impacts. We learned at the November 26, 2008, PLUS meeting that the Town has a draft ordinance; we would appreciate the opportunity to review the draft ordinance to determine if it will protect the resource.

New Castle County (NCC) defines excellent ground-water recharge potential areas as 'recharge areas'. Recharge areas are characterized as deposits of coarser grained material that have the best ability to transmit water vertically through the unsaturated zone to the water table. The NCC recharge areas were mapped using the methods described in the Delaware Geological Survey Open File Report No. 34, "Methodology for Mapping Ground-Water Recharge Areas in Delaware's Coastal Plain" (Andres, 1991), and depicted in a series of maps prepared by the Delaware Geological Survey (Butoryak and Tally, 1993).

The GPB recommends that the portion of the new development within the excellent ground-water recharge potential area not exceed 20% impervious cover. Some allowance for augmenting ground-water recharge should be implemented if the impervious cover exceeds 20% but is less than 50% of that portion of the parcel within this area. However, the development should not exceed 50% regardless (DNREC, 2005). A water balance calculation (environmental assessment) will be necessary to determine the quantity of clean water to be recharged via a recharge basin (Thornthwaite, 1957). The purpose of an impervious cover threshold is to minimize loss of recharge (and associated increases in storm water) and protect the quality and quantity of ground water.

The proposed development would change the impervious over from 0% to approximately 75%. The developer on the PLUS application provided these numbers. A large percentage of this is parking and roadways. This land use produces petroleum hydrocarbons, other organics, metals, and other inorganics (DNREC, 1999). These contaminants associated with this land use could easily infiltrate the unconfined aquifer and compromise water quality.

GWPB recommends:

- Reduce impervious cover to less than 50%
- Perform an environmental assessment report showing that water quality as well as water quantity of post development recharge is equal to or greater than pre-development recharge.
- Quantify amount of recharge lost due to impervious cover and provide for onsite infiltration of water at least equal to or greater than pre-development recharge (Kaufmann, 2005).
- Pretreatment of parking area runoff to remove chemical and nutrient loads

In addition, because the excellent ground water recharge area can so quickly affect the underlying aquifer if contaminants are spilled or discharged across the area, the storage of hazardous substances or wastes should not be allowed within the area unless specific approval is obtained from the relevant state, federal, or local program.

References

Andres, A. Scott, 1991, Methodology for Mapping Ground-Water Recharge Areas in Delaware's Coastal Plain: Delaware Geological Survey Open File Report No. 34, p. 18.

Butoryak, Kathleen R. , and Talley, John H., 1993, Delineation of Ground-Water Recharge Resource Protection Areas in the Coastal Plain of New Castle County, Delaware: Delaware Geological Survey Project Report for the Water Resources Agency for New Castle County, p. 26.

Delaware Department of Natural Resources and Environmental Control (2005): *Source Water Protection Guidance Manual for the Local Governments of Delaware*: Dover, DE, 144 p.
http://www.wr.udel.edu/publications/SWAPP/swapp_manual_final/swapp_guidance_manual_final.pdf

Delaware Department of Natural Resources and Environmental Control. (1999). The State of Delaware Source Water Assessment Plan: Dover, DE, p. 301.
<http://www.wr.udel.edu/swaphome/publications.html>



Kauffman, G.J., Wozniak, S.L., and Vonck, K.J., 2005, *Delaware Ground-Water Recharge Design Manual*: Newark, DE, Water Resources Agency, University of Delaware, p. 31.
<http://www.wr.udel.edu/swaphome/Publications/SWPguidancemanual.html>

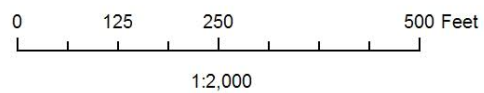
Thornthwaite, C. W., and Mather, J. R., 1957, Instructions and Tables for Computing Potential Evapotranspiration and the Water Balance, Volume x, Drexel Institute of Technology, Laboratory of Climatology.

Northside Shopping Center Parcel B (PLUS 2008-11-04)



Legend

-  New Castle County Tax Map Parcels
-  Excellent Ground-Water Recharge Potential Area



Water Supply

The project information sheets state water will be provided to the project by the Town of Middletown via a public water system. Our records indicate that the project is located within the public water service area granted to the Town of Middletown under Certificate of Public Convenience and Necessity 91-CPCN-12.

Should dewatering points be needed during any phase of construction, a dewatering well construction permit must be obtained from the Water Supply Section prior to construction of the well points. In addition, a water allocation permit will be needed if the pumping rate will exceed 50,000 gallons per day at any time during operation.

All well permit applications must be prepared and signed by licensed water well contractors, and only licensed well drillers may construct the wells. Please factor in the necessary time for processing the well permit applications into the construction schedule. Dewatering well permit applications typically take approximately four weeks to process, which allows the necessary time for technical review and advertising.

Should you have any questions concerning these comments, please contact Rick Rios at 302-739-9944.

Sediment and Stormwater

- A detailed sediment and stormwater plan will be required prior to any land disturbing activity taking place on the site. Contact the reviewing agency to schedule a pre-application meeting to discuss the sediment and erosion control and stormwater management components of the plan as soon as practicable. The site topography, soils mapping, pre and post development runoff, and proposed method(s) and location(s) of stormwater management should be brought to the meeting for discussion. The plan review and approval as well as construction inspection will be coordinated through Town of Middletown. Contact Town of Middletown at (302) 378-9120 for details regarding submittal requirements and fees.

Site Investigation and Restoration

Only one Site Investigation & Restoration Branch (SIRB) site was found within a half mile radius of the proposed site: Johnson Control (DE-0048) located 0.042 miles from the proposed development.

Johnson Control, previously known as Globe Union, was a vehicle battery manufacturing plant. In 1983, Globe Union was under investigation for a lead oxide release. The lead oxide was released in a gas form and settled in a nearby ditch, downwind of the plant. Information regarding the remedial action is not available. Globe Union did receive a No Further Action designation in spring of 1999.

Based on the previous manufacturing and industrial use of the proposed project site, which involved the use of hazardous substances, SIRB recommends that a Phase I Environmental Site Assessment be performed prior to development. In addition, should a release or imminent threat of a release of hazardous substances be discovered during the course of development (e.g., contaminated water or soil), construction activities should be discontinued immediately and DNREC should be notified at the 24-hour emergency number (800-662-8802). SIRB should also be contacted as soon as possible at 302-395-2600 for further instructions.

Under/Aboveground Storage Tank

There are five (5) inactive leaking underground storage tank (LUST) sites located within a quarter mile from the proposed construction.

Name: One Stop Shop (Inactive)

Facility ID: 3-000247

Project: N9212292

Name: Army National Guard-Wm Nelson Armory (Inactive)

Facility ID: 3-000733

Project: N9301003

Name: Army National Guard-Wm Nelson Armory (Inactive)

Facility ID: 3-000733

Project: N9612206

Name: Johnson Controls, Inc (Inactive)

Facility ID: 3-000176

Project: N9208207

Name: Southern States-Middletown (Inactive)

Facility ID: 3-000158

Project: N9108183

No environmental impact is anticipated; however, should any additional underground storage tanks or petroleum contaminated soil be discovered by any person during construction, the DNREC-TMB at (302) 395-2500 and the DNREC Emergency Response Hotline at (800) 662-8802 must be notified within 24 hours.

In addition, should petroleum contamination be encountered during new construction activities, note that PVC pipe materials will have to be replaced with ductile steel and nitrile rubber gaskets in the contaminated areas.

Northside Shopping Center/Parcel B

2008-11-04

Page **8** of **8**

Also, please note that if any aboveground storage tanks (ASTs) less than 12,500 gallons are installed, they must be registered with the TMB. If any ASTs greater than 12,500 gallons are installed, they are also subject to installation approval by the TMB.